

What is claimed is:

1. A tibial augment for use with a knee joint prosthesis, comprising:
  - 2 an annular member with a proximal surface, a distal surface, an outer
  - 3 anterior surface, an inner anterior surface, an outer posterior surface, an inner posterior
  - 4 surface, an inner lateral surface, an outer lateral surface, an inner medial surface and
  - 5 an outer medial surface;
- 6 said outer lateral surface being curved to define a continuous surface
- 7 connecting said outer posterior surface and said outer anterior surface;
- 8 said outer medial surface being curved to define a continuous surface
- 9 connecting said outer posterior surface and said outer anterior surface;
- 10 said outer anterior surface being a slightly curved surface; and
- 11 said outer posterior surface being a generally planer surface.

1. 2. The tibial augment defined in Claim 1, wherein said annular  
2 member is sized to fit, at least partially, within a cavity formed in a proximal portion  
3 of a human tibia.

1. 3. The tibial augment defined uniform thickness, whereby each  
2 outer surface of said substantially uniform in Claim 1, wherein at least a majority  
3 portion of said annular member is of a substantially thickness majority portion is  
4 spaced a substantially constant distance from each associated inner surface.

1                   4. The tibial augment defined in Claim 3, wherein said inner  
2   anterior surface includes a distal/proximal extending channel therein, thereby defining  
3   a reduced thickness portion.

1                   5. The tibial augment defined in Claim 4, wherein said majority  
2   portion of a substantially uniform thickness is approximately 5mm thick and said  
3   reduced thickness portion is approximately 3mm thick at the narrowest point thereof.

1                   6. The tibial augment defined in Claim 1, wherein said inner  
2   anterior surface includes a distal/proximal extending channel therein, thereby defining  
3   a reduced thickness portion.

1                   7. The tibial augment defined in Claim 1, wherein said annular  
2   member is composed of a tantalum based porous metal.

1                   8. The tibial augment defined in Claim 1, wherein said outer  
2   posterior surface has a distal taper of less than approximately 17°.

1                   9. The tibial augment defined in Claim 1, wherein said outer medial  
2   surface and said outer lateral surface each have a distal taper of between  
3   approximately 8° and approximately 30°.

1                   10. The tibial augment defined in Claim 1, wherein said outer  
2                   anterior surface has essentially no distal taper.

1                   11. The tibial augment defined in Claim 1, further comprising a  
2                   stepped distal surface, thereby defining a first distal surface and a second distal surface  
3                   with a transition surface therebetween, wherein said first distal surface is located at a  
4                   greater distance from said proximal surface than said second distal surface.

1                   12. The tibial augment defined in Claim 11, wherein said transition  
2                   surface is located midway between said outer lateral surface and said outer medial  
3                   surface.

1                   13. The tibial augment defined in Claim 11, wherein said transition  
2                   surface is located closer to said outer lateral surface than to said outer medial surface.

1                   14. The tibial augment defined in Claim 11, wherein said transition  
2                   surface is located closer to said outer medial surface than to said outer lateral surface.

1                   15. The tibial augment defined in Claim 1, wherein said annular  
2                   member is composed of a material that is substantially transparent to provide an  
3                   indication of bony contact when said annular member is used as a provisional.

1                   16. The tibial augment defined in Claim 1, wherein said annular  
2 member is made of a photo-elastic material that provides an indication of bony contact  
3 when said annular member is used as a provisional.

1                   17. The tibial augment defined in Claim 1, further comprising at least  
2 one set of generally lateral/medial extending grooves formed on at least two opposing  
3 inner surfaces of said annular member to facilitate insertion and removal of the tibial  
4 augment when used as a provisional.

1                   18. The tibial augment defined in Claim 17, wherein said at least one  
2 set of generally lateral/medial extending grooves are formed on said inner lateral  
3 surface and said inner medial surface; and further wherein said annular member is  
4 composed of a material that is substantially transparent.

1                   19. An implant system for use with a knee joint prosthesis, said  
2 implant system comprising:

3                   a plurality of differently-sized tibial augments, wherein each said tibial  
4 augment is an annular member that is substantially shaped as a truncated cone with a  
5 generally oblongated oval cross-section that is symmetric about its minor axis, each of  
6 said annular members being sized to fit within a cavity of a corresponding size formed  
7 in a proximal portion of a human tibia of an appropriate size.

1                   20. The implant system as defined in Claim 19, further comprising:  
2                   a plurality of differently-sized tibial augment pushers, with at least one  
3                   pusher configured for use with each size of tibial augment, said pushers being  
4                   configured and arranged for implanting each of said differently-sized tibial augments  
5                   within a human tibia

1                   21. The implant system as defined in Claim 20, wherein at least one  
2                   pusher of said plurality of pushers is configured for use with more than one size of  
3                   said differently sized tibial augments.

1                   22. The implant system as defined in Claim 20, wherein each of said

2                   pushers includes:

3                   a handle portion; and  
4                   an augment seating portion, connected to one end of said handle portion,  
5                   wherein said augment seating portion is configured and arranged to seat a tibial  
6                   augment of at least one particular size.

1                   23. The implant system as defined in Claim 19, further comprising:

2                   a plurality of differently-sized guides, with one guide being configured  
3                   for use with each size of tibial augment; and  
4                   a plurality of osteotomes configured and arranged to cooperate with each  
5                   of said guides, said osteotomes and said guides being configured and arranged to

6 create an appropriately sized cavity within a proximal portion of a human tibia for  
7 implanting an appropriately sized tibial augment therein.

1                   24. The implant system as defined in Claim 19, further comprising:  
2                   a plurality of differently-sized provisional tibial augments, with one of  
3                   said provisional tibial augments corresponding in size and shape to each of said tibial  
4                   augments, and each of said provisional tibial augments being composed of a material  
5                   that is substantially transparent.

1                   25. The implant system as defined in Claim 24, wherein:  
2                   each of said provisional tibial augments includes a plurality of grooves  
3                   on a plurality of inner surfaces thereof,  
4                   a plurality of differently-sized holders, configured for use with said  
5                   provisional tibial augments, each of said holders including a plurality of ribs, with  
6                   each of said ribs being configured and arranged to correspond to one of said grooves  
7                   on said provisional tibial augment, such that an appropriately sized one of said holders  
8                   is capable of holding one of said provisional tibial augments during removal of said  
9                   provisional tibial augment from a cavity formed within a proximal portion of a human  
10                  tibia.

1                   26. A method of correcting for tibial defects during knee  
2 replacement surgery:

3                   preparing an existing cavity, or creating a cavity in a proximal portion of  
4 a human tibia;  
5                   inserting a tibial augment within said cavity; and  
6                   attaching a tibial portion of a knee joint prosthesis to said tibial augment.

1                   27. The method of correcting for tibial defects, as defined in Claim  
2 26, further comprising the step of:

3                   selecting an appropriately sized tibial augment from a group of  
4 differently sized tibial augments.

1                   28. The method of correcting for tibial defects, as defined in Claim  
2 26, wherein:

3                   during said step of preparing or creating said cavity, a guide and a set of  
4 osteotomes are utilized to form said cavity, said guide including a slot with different  
5 portions thereof configured for accepting different osteotomes of said set of  
6 osteotomes.

1                   29. The method of correcting for tibial defects, as defined in Claim  
2 26, further comprising the step of inserting a second tibial augment within said cavity,  
3 wherein said second tibial augment is stacked upon said tibial augment originally  
4 inserted within said cavity.

1                   30. The method for correcting for tibial defects, as defined in Claim  
2                   26, wherein prior to said step of inserting a tibial augment within said cavity, a  
3                   provisional tibial augment is temporarily inserted into said cavity.

1                   31. The method for correcting for tibial defects, as defined in Claim  
2                   30, further comprising the step of using said provisional tibial augment as a tamp to  
3                   tamp a bone graft into position.

1                   32. A pusher for use with a tibial augment, said pusher comprising:  
2                   a handle portion; and  
3                   an augment seating portion, connected to one end of said handle portion,  
4                   wherein said augment seating portion is configured and arranged to seat at least one  
5                   particularly sized tibial augment.

1                   33. The pusher as defined in Claim 32, wherein:  
2                   said augment seating portion includes a head portion and a platform  
3                   portion, which are attached together, and wherein said platform portion is attached to  
4                   said handle portion of said pusher;  
5                   said platform portion including a generally planar surface at an interface  
6                   between said platform portion and said head portion; and  
7                   said head portion including a plurality of tapered surfaces, such that a  
8                   cross-section of said head portion decreases with increasing distance from said  
9                   generally planar surface of said head portion.

1                   34. An osteotome used for creating a cavity in a bone, said osteotome  
2 comprising:

3                   a handle portion; and

4                   a cutting portion attached to said handle portion, wherein said cutting  
5 portion includes:

6                   a tapered edge at a distal end thereof;

7                   at least one stop for hindering penetration of said cutting portion into  
8 said bone past a predetermined distance.

1                   35. The osteotome as defined in Claim 34, wherein said at least one  
2 stop includes two stops, with one of said stops being configured for hindering  
3 penetration of said cutting portion into said bone past a first predetermined distance  
4 and with the other one of said stops being configured for hindering penetration of said  
5 cutting portion into said bone past a second predetermined distance.

1                   36. The osteotome as defined in Claim 35, wherein:

2                   one of said stops is configured to cooperate with a guide of a first size  
3 and the other of said stops is configured to cooperate with a guide of a second size,  
4 where said second size is different from said first size.

1                   37. The osteotome as defined in Claim 34, wherein said cutting  
2 portion is curved into an arc shape.

1                   38. The osteotome as defined in Claim 35, wherein:  
2                   said cutting portion is generally planar, with said plane defined by said  
3 generally planar cutting portion being situated at an oblique angle with respect to a  
4 longitudinal axis of said handle portion.

1                   39. The osteotome as defined in Claim 35, wherein said osteotome is  
2 configured and sized to create a cavity in a proximal portion of a human tibia.

1                   40. A guide for use with at least one osteotome when creating a  
2 cavity in a bone, said guide comprising:  
3                   an upper surface;  
4                   a generally planar lower surface;  
5                   a generally C-shaped slot extending from said upper surface to said  
6 generally planar lower surface; and  
7                   a securing arrangement to secure said guide to the bone within which the  
8 cavity is being created, said securing arrangement securing said guide such that said  
9 generally planar lower surface faces the bone within which a cavity is being created.

1                   41. The guide as defined in Claim 40, wherein said securing  
2 arrangement includes:

3                   an aperture with a central axis extending in a direction generally  
4 perpendicular to said generally planar lower surface, wherein said aperture is  
5 configured to accept an intramedullary rod.

1                   42. The guide as defined in Claim 41, wherein said securing  
2 arrangement further includes:

3                   a threaded hole extending in a direction generally transverse to said  
4 plane of said generally planar lower surface; and  
5                   a setscrew configured to extend through said threaded hole and to  
6 contact the intramedullary rod such that said guide is retained in position with respect  
7 to the intramedullary rod within said aperture.

1                   43. The guide as defined in Claim 41, wherein said aperture is  
2 generally triangular-shaped, and said aperture extends completely through said guide  
3 from said generally planar lower surface to said upper surface.

1                   44. The guide as defined in Claim 40, wherein portions of said  
2 generally C-shaped slot are tapered inwardly toward said generally planar lower  
3 surface.

1                   45. A system used for creating a cavity in a proximal portion of a  
2 human tibia for use prior to implanting a knee joint prosthesis, said system comprising:  
3                   a guide that includes:  
4                   an upper surface;  
5                   a lower surface;  
6                   a generally C-shaped slot extending from said upper surface to  
7 said lower surface; and  
8                   a securing arrangement to secure said guide to the bone within  
9 which the cavity is being created, said securing arrangement securing said guide such  
10 that said lower surface faces the bone within which the cavity is being created; and  
11                   a set of osteotomes configured and arranged to be inserted within said  
12 generally C-shaped slot of said guide.

1                   46. The system according to Claim 45, wherein each of said  
2 osteotomes within said set includes at least one stop for hindering penetration of a  
3 cutting portion of said osteotome into said bone past a predetermined distance by  
4 contacting a surface of said upper surface of said guide adjacent to said C-chapped  
5 slot.

1                   47. The system as defined in Claim 46 wherein said at least one stop  
2 on each of said osteotomes within said set includes two stops, with one of said stops  
3 being configured for hindering penetration of said cutting portion into said bone past a  
4 first predetermined distance and with the other one of said stops being configured for

5 hindering penetration of said cutting portion into said bone past a second  
6 predetermined distance.

1                   48. A holder for inserting and/or removing a provisional augment  
2 to/from a cavity in a bone, said holder comprising:

3                   a body portion defining a longitudinal axis;  
4                   a pair of legs extending from said body portion;  
5                   a finger connected to each of said legs; and  
6                   a rib extending outwardly from each of said fingers, each of said ribs  
7 extending in a direction generally perpendicular to said longitudinal axis of said body  
8 portion, wherein said ribs are configured and arranged to correspond to grooves on an  
9 inner surface of a provisional augment.

1                   49. The holder as defined in Claim 48, further comprising a pair of  
2 stops configured and arranged to be seated upon a proximal surface of the provisional  
3 augment, whereby said stops serve as locators for properly locating said ribs of said  
4 holder with respect to the grooves of the provisional augment.

1                   50. The holder as defined in Claim 48, wherein said pair of legs  
2 comprises a pair of flexible legs, such that application of a force upon outer surfaces  
3 of said legs allows for said ribs to be disengaged from the grooves on the inner surface  
4 of the provisional augment without significantly altering the location of the provision  
5 augment.

1                   51. The holder as defined in Claim 48, wherein:  
2                   each of said legs is a relatively rigid member; and  
3                   each of said fingers is attached to one of said legs such that said fingers  
4                   are movable with respect to said legs, whereby movement of said fingers with respect  
5                   to said legs allows for said ribs to be disengaged from the grooves on the inner surface  
6                   of the provisional augment without significantly altering the location of the provision  
7                   augment.

1                   52. The holder as defined in Claim 51, wherein a distance between  
2                   said fingers is adjustable to permit said holder to be used with provisional augments of  
3                   different sizes.

1                   53. The holder as defined in Claim 51, wherein said fingers are  
2                   attached to said legs via a threaded shaft that is threaded in one direction where one of  
3                   said fingers is connected thereto and in an opposite direction where the other of said  
4                   fingers is connected thereto, whereby when said threaded shaft is rotated in a first  
5                   direction with respect to said legs, said fingers are moved towards each other and  
6                   when said threaded shaft is rotated in an opposite direction with respect to said legs,  
7                   said fingers are moved away from each other.

1                   54. The holder as defined in Claim 51, further comprising:  
2                   a threaded shaft that extends from one of said legs to the other of said  
3                   legs and is rotatable with respect to said legs and connects said fingers to said legs,

4 said threaded shaft being threaded in one direction where one of said fingers is  
5 connected thereto and in an opposite direction where the other of said fingers is  
6 connected thereto; and

7 a secondary shaft that extends from one of said legs to the other of said  
8 legs, with said fingers being movably attached thereto.

1 55. The holder as defined in Claim 54, wherein said secondary shaft  
2 includes a slight taper from a center thereof outwardly towards each of said legs.